INSECT DISEASE REPORT
USDA FOREST SERVICE/NORTHERN REGION

WMC

Report No. 73-29

5200
December 1973

EVALUATION OF MOUNTAIN PINE BEETLE INFESTATIONS, BIG BELT MOUNTAINS, TOWNSEND DISTRICT, HELENA NATIONAL FOREST--1973

by

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ABSTRACT

Mountain pine beetle, *Dendroctonus ponderosae* Hopk., reached near epidemic levels in lodgepole pine stands in the Sulphur Creek-Black Butte area. Lodgepole pine are probably more susceptible due to the overstocked conditions of stands, and high incidence of girdling of the base of trees by porcupines. The infestation in this area was classified as static with a decreasing trend.

Mountain pine beetle and pine engraver beetle, *Ips* spp., increased to epidemic levels in blowdown and top-broken second-growth ponderosa pine in the North Fork of Roy and Grunett Creek drainages on State, private and Bureau of Land Management lands. Several hundred ponderosa pines are now infested. Sufficient brood is present to cause an increase in number of trees killed in 1974.

Several hundred subalpine fir were killed by the fir engraver beetle, *Scolytus ventralis* Lec., the western balsam bark beetle, *Dryocoetes confusus* Sw., and *Pityokteines* sp. Faded tree groups occur from Duck Creek Pass north to Slough Creek. Most infested groups are adjacent to current or recent logging activity that provided slash and served as a breeding site and source of population buildup.

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EXPERIMENT STATION

INTRODUCTION

This evaluation survey was a followup of aerial detection surveys conducted during August 1973. Numbers of faded trees and size and frequency of faded groups of trees indicated infestations may be increasing to epidemic levels in the Big Belt Mountains. An evaluation was made during the week of October 29 to determine current status of bark beetle infestations in these areas.

SURVEY RESULTS

Mountain pine beetle - lodgepole pine.--An outbreak of mountain pine beetle developed in mixed lodgepole pine-Douglas-fir stands in the Sulphur Bar Creek drainage and Black Butte Gulch in the Big Belt Mountains about 18 miles east of Townsend, Montana, in 1973 (Fig. 1). Infested groups of trees are scattered, and vary from 5 to 75 trees per group. The largest infested group consisted of 75 trees that occurred just west of Black Butte. However, this group of faders and the 1973 attacked trees were salvage logged prior to ground checking.

Three other infested groups were examined in the Sulphur Bar Creek drainage. In the first group, approximately twenty-eight 1973 faders, ranging from 9 to 15 inches d.b.h. and averaging 10.6 inches, occurred. Ratio of old to newly attacked was 6:1. Trees attacked this year ranged from 10 to 14 inches d.b.h., averaging 11.8 inches.

In the second area, about thirty 1973 faders were found compared to 15 newly attacked trees. Infested trees in this area averaged 11.5 inches d.b.h.

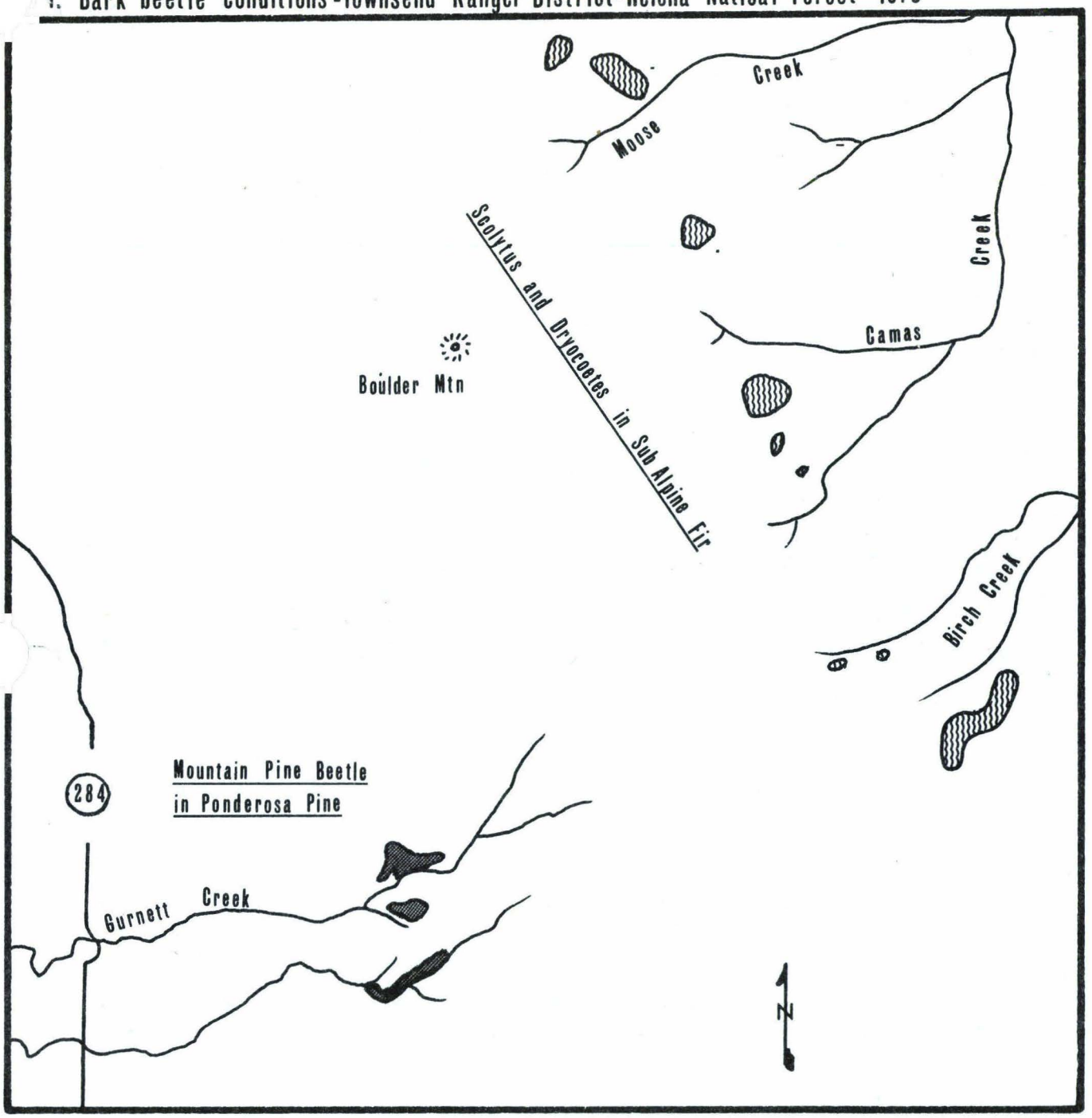
In the third area, five 1973 faders were found, but no newly attacked trees were present.

Trees in all areas examined were heavily woodpeckered. Woodpeckers destroyed bark beetle broods by direct feeding, by removing bark, causing some larvae to drop to the ground and others to dessicate from exposure to direct sunlight. This may be an important factor in fewer trees being attacked in 1973 than in 1972.

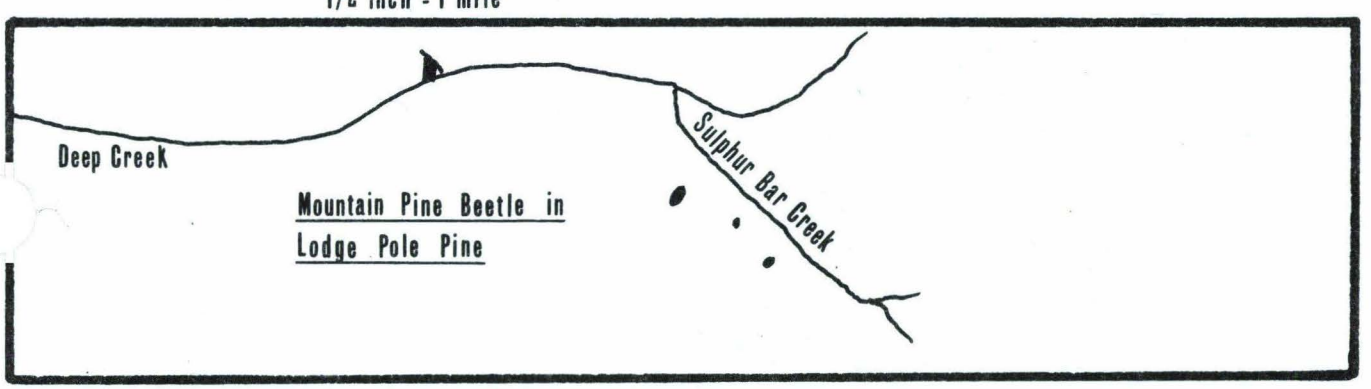
In all three areas, the majority of lodgepole pine has been girdled at the base by porcupines or other rodents. Partially and completely girdled trees had been attacked by *Ips* sp. and *Pityogenes* sp. and were dead. Only a few girdled trees were strip attacked by mountain pine beetle.

Mountain pine beetle - ponderosa pine.--Mountain pine beetle killed scattered groups of second-growth ponderosa pine on State, private, and Bureau of Land Management lands in the North Fork of Roy Creek and Grunett Creek. Infested trees occur at lower elevations (Fig. 1). Size of trees killed ranges from 9.5 to 23 inches d.b.h., average 11.5. Majority of

1. Bark beetle conditions - Townsend Ranger District - Helena Natioal Forest 1973



1/2 inch = 1 mile



the brood was in mature larval and callow adult stage. Gallery starts averaged 2.8 square feet of bark area sampled. Ratio of brood to parent adults was 4:1. The majority of infested trees occur on dry, rocky sites. Blowdown and top-broken trees are prevalent throughout areas examined. *Ips* sp. occur in conjunction with mountain pine beetle in the infested trees.

Fir engraver beetles.--*Scolytus ventralis* Lec., *Dryocoetes confusus* Sw., and *Pityokteines* sp. Groups of infested trees killed by these beetles occur from the head of Little Birch Creek north to Slough Creek (Fig. 1). Largest infestation centers have developed adjacent to current logging activity. However, new infested groups have developed in undisturbed stands at some distance from cutover areas. More than one year is often necessary to kill some trees, and many are only top-killed in one year then reinfested the following season.

DISCUSSION

The mountain pine beetle infestation in the Sulphur Bar Creek drainage is static to decreasing. The number of trees attacked in 1973 is about one-half the number killed in 1972. Trees are heavily woodpeckered resulting in a reduction of mountain pine beetle broods. The infestation is expected to decline further in 1974. However, the stand is still susceptible to mountain pine beetle attack due to size of trees and the high incidence of girdling by rodents which weakens trees making them susceptible to attack by secondary bark beetle.

When control (chemical) has been initiated percent survival and length of infestation period in both treated and untreated areas remained about the same within the same elevation levels (Amman and Baker, 1972). Therefore, chemical control is not advised.

Average infested tree diameter in areas examined was about 11 inches d.b.h. In lodgepole pine stands, the mountain pine beetle prefers the larger and healthier trees in the stand, since they have the thickest phloem. Phloem thickness is one of the most important factors affecting mountain pine beetle survival (Cole 1973). Cole also found that only trees 14 inches d.b.h. or larger produce enough beetles to increase the infestation or maintain it at the previous year's level. Since average diameter is 11 inches d.b.h., the infestation could continue at a static level for several years or decline.

Selective logging to remove larger diameter trees with thicker phloem which the beetle prefers, would reduce the potential for continued mountain pine beetle losses. By removing girdled trees, the incidence of secondary bark beetle attack would decline. A buildup of secondary bark beetles might result in these beetles predisposing many lodgepole pine to attack by mountain pine beetle.

Infestations in the North Fork of Roy and Grunett Creeks probably started from the extensive blowdown and top-broken ponderosa pine scattered throughout the areas. The blowdown probably occurred in late 1972 or early 1973 as most trees still retained needles. Although this type of material only provides a limited breeding site for mountain pine beetle broods, it provides an excellent source for population buildup for *Ips*. Larger down trees and top-broken trees do serve as a source for population buildup of mountain pine beetle.

Currently infested trees were on extremely dry, rocky sites. With the dry year experienced in 1973, trees were probably stressed and more susceptible to bark beetle attack. Effects of moisture stress will probably carry through next year, and additional trees could be killed in 1974. This will occur unless extremely cold temperatures or predation by woodpeckers causes excessive brood mortality before beetle flight next June. The majority of infested trees occur along existing roads, which provides an excellent opportunity for salvage logging prior to beetle flight next June.

Engraver beetle infestations in subalpine fir may continue for several years now that the population has increased to epidemic levels. Salvage logging of infested trees and burning slash would do much to reduce beetle populations.

REFERENCES

Amman, Gene D. and Bruce H. Baker, 1972. Mountain pine beetle influences on lodgepole pine stand structure. Jour. of Forestry, Vol. 70, No. 4, 6 pp.

Cole, Walter E., 1973. Interaction between mountain pine beetle and dynamics of lodgepole pine stands. USDA, Forest Service, Ogden, Utah, Res. Note INT-170.